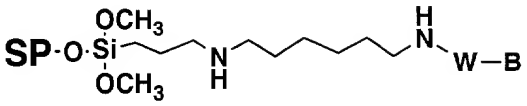
Claims

WHAT IS CLAIMED IS:

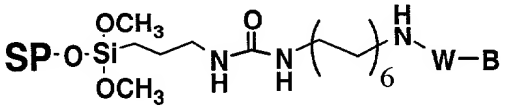
1. A compound of the Formula I:



I

wherein SP is a solid support, W is a chemical linkage, and B represents a terminal chemical group.

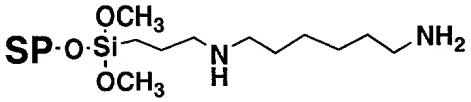
2. A compound of the Formula II:



II

wherein SP is a solid support, W is a chemical linkage, and B represents a terminal chemical group.

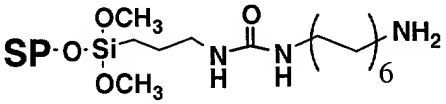
3. A compound of the Formula V(a):



V(a)

wherein SP is a solid support.

4. A compound of the Formula VI(a):



VI(a)

wherein SP is a solid support.

5. A method for oligonucleotide synthesis comprising:

a) 5'-Deblocking;

b) Coupling;

c) Oxidation; and

d) Capping;

wherein (a), (b), (c) and (d) are repeated under conditions suitable for the synthesis of the oligonucleotide, and wherein the synthesis of the oligonucleotide is carried out in the presence of the compound of claim 1.

6. A method for oligonucleotide synthesis comprising:

a) 5'-Deblocking;

b) Coupling;

c) Oxidation; and

d) Capping;

wherein (a), (b), (c) and (d) are repeated under conditions suitable for the synthesis of the oligonucleotide, and wherein the synthesis of the oligonucleotide is carried out in the presence of the compound of claim 2.

7. A method for oligonucleotide synthesis comprising:

a) 5'-Deblocking;

b) Coupling;

c) Oxidation; and

d) Capping;

wherein (a), (b), (c) and (d) are repeated under conditions suitable for the synthesis of the oligonucleotide, and wherein the synthesis of the oligonucleotide is carried out in the presence of a compound having Formula IX:

IX

wherein,

SP is a solid support;

X represents a spacer comprising a linear chemical moiety Y-Z-W of between 10 and 24 atoms where Z is a diradical chemical moiety, Y and W independently comprise a chemical linkage; and

B represents a terminal chemical group,

wherein the chemical linkage Y between SP and X comprises a silyl ether, urea, amide, or carbamate linkage and the chemical linkage W between the X and B comprises a carboxy, amino, carboxamido, mercaptoalkyl, succinyl, oxalyl, or photolabile linker.

8. The compound of claim 1, wherein said B comprises a nucleic acid, nucleoside, nucleotide, or non-nucleosidic succinate derivative.

9. The compound of claim 2, wherein said B comprises a nucleic acid, nucleoside, nucleotide, or non-nucleosidic succinate derivative.

10. The compound of claim 8, wherein said B comprises an acid labile protecting group.

11. The compound of claim 9, wherein said B comprises an acid labile protecting group.

12. The compound of claim 10, wherein said acid labile protecting group is a dimethoxytrityl, monomethoxytrityl, or trityl group.

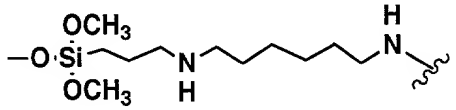
13. The compound of claim 11, wherein said acid labile protecting group is a dimethoxytrityl, monomethoxytrityl, or trityl group.

14. The method of claim 7, wherein said B of a compound of Formula IX comprises a nucleic acid, nucleoside, nucleotide, or non-nucleosidic derivative.

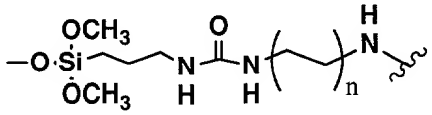
15. The method of claim 14, wherein said B further comprises an acid labile protecting group.

16. The compound of claim 15, wherein said acid labile protecting group is a dimethoxytrityl, monomethoxytrityl, or trityl group.

17. The method of claim 7, wherein said X of a compound of Formula IX represents:



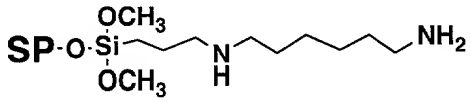
18. The method of claim 7, wherein said X of a compound of Formula IX represents:



wherein n is 1, 2, 3, 4, 5 or 6.

19. A method of synthesizing a compound of claim 3 wherein SP is controlled pore glass (CPG), comprising silanization of native Controlled Pore Glass (CPG) with N-(6-aminohexyl)aminopropyl trimethoxy silane under conditions suitable for isolation of said compound.

20. A method of synthesizing a compound of claim 1, comprising coupling a terminal chemical group to a compound of Formula V(a):



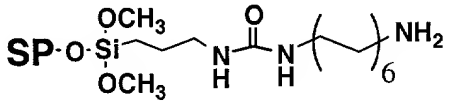
V(a)

under conditions suitable for the isolation of said compound of claim 1.

21. The method of claim 20, wherein said coupling is at a loading from about 50 to about 100 umol/gram of said SP.

22. The method of claim 20, wherein said coupling is at a loading of about 75 to about 85 umol/gram of said SP.

23. A method of synthesizing a compound of claim 2, comprising coupling a terminal chemical group to a compound of Formula VI(a):



VI(a)

under conditions suitable for the isolation of said compound of claim 2.

24. The method of claim 23, wherein said coupling is at a loading of about 40 to about 80 umol/gram of said SP.

25. The method of claim 23, wherein said coupling is at a loading of about 50 to about 60 umol/gram of said SP.

26. The method of claim 5, wherein said synthesis is carried out on a reaction scale of about 0.1 umol to about 100 umol.

27. The method of claim 6, wherein said synthesis is carried out on a reaction scale of about 0.1 umol to about 100 umol.

28. The method of claim 7, wherein said synthesis is carried out on a reaction scale of about 0.1 umol to about 100 umol.

29. The method of claim 5, wherein said synthesis is carried out on a reaction scale of about 100 umol to about 1 mmol.

30. The method of claim 6, wherein said synthesis is carried out on a reaction scale of about 100 umol to about 1 mmol.

31. The method of claim 7, wherein said synthesis is carried out on a reaction scale of about 100 umol to about 1 mmol.

32. The method of claim 5, wherein said synthesis is carried out on a reaction scale of about 1 mmol to about 1 mol.

33. The method of claim 6, wherein said synthesis is carried out on a reaction scale of about 1 mmol to about 1 mol.

34. The method of claim 7, wherein said synthesis is carried out on a reaction scale of about 1 mmol to about 1 mol.

35. The method of claim 5, wherein said synthesis is carried out on a reaction scale of about 1 mol to about 1000 mol.

36. The method of claim 6, wherein said synthesis is carried out on a reaction scale of about 1 mol to about 1000 mol.

37. The method of claim 7, wherein said synthesis is carried out on a reaction scale of about 1 mol to about 1000 mol.

38. The compound of claim 1, wherein said SP is a controlled pore glass support.

39. The compound of claim 2, wherein said SP is a controlled pore glass support.

40. The compound of claim 3, wherein said SP is a controlled pore glass support.

41. The compound of claim 4, wherein said SP is a controlled pore glass support.

42. The method of claim 7, wherein said SP is a controlled pore glass support.

43. The compound of claim 1, wherein said B is abasic succinate.

44. The compound of claim 2, wherein said B is abasic succinate.

45. The method of claim 7, wherein said B is abasic succinate.

46. The compound of claim 1, wherein said B, is an adenosine, cytidine, guanosine, thymidine, or uridine succinate.

47. The compound of claim 2, wherein said B, is an adenosine, cytidine, guanosine, thymidine, or uridine succinate.

48. The method of claim 7, wherein said B is an adenosine, cytidine, guanosine, thymidine, or uridine succinate.

49. The method of claim 7, wherein said atoms in said spacer molecule X is selected from the group consisting of oxygen, carbon, hydrogen, nitrogen, and sulfur.

50. The method of claim 7, wherein the number of atoms in said spacer molecule X is 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, or 24.

51. The method of claim 5, wherein said B is linked to the oligonucleotide with a 3'-5', 3'-2', or 3'-3' linkage.

52. The method of claim 6, wherein said B is linked to the oligonucleotide with a 3'-5', 3'-2', or 3'-3' linkage.

53. The method of claim 7, wherein said B is linked to the oligonucleotide with a 3'-5', 3'-2', or 3'-3' linkage.